

Giovanni Pasini* & Alessandro Garassino**

Studies on Permo-Trias of Madagascar. 7.
New record of *Halicyne gondwanae* Brambilla *et al.*, 2002
(Crustacea, Cycloidea) from the Lower Triassic (Olenekian)
of Ambilobé region (NW Madagascar)

Abstract – Brambilla *et al.* (2002) described the new species *Halicyne gondwanae* (order Cycloidea Glaessner, 1928, family Cyclidae Packard, 1885), based on a sample of three specimens, discovered in some outcrops from the Lower Triassic (Olenekian) and located in the Ambilobé region (NW Madagascar), the first record of this genus in the Gondwana. The morphological description of this species was incomplete due to the bad state of preservation of the specimens. During a recent field research, one of the authors (G. Pasini) discovered a new specimen belonging to this species. Its good state of preservation permitted description of some morphological characters not preserved in the previous specimens and to make a three-dimensional reconstruction of *Halicyne gondwanae* Brambilla *et al.*, 2002. Finally, the discovery of this new specimen, coming from an outcrop different to the others, enlarges the geographical distribution of this cycloid in Ankitokazo basin.

Key words: Crustacea, Cycloidea, Lower Triassic, NW Madagascar.

Riassunto – Studi sul Permo-Trias del Madagascar. 7. Nuovo rinvenimento di *Halicyne gondwanae* Brambilla *et al.*, 2002 (Crustacea, Cycloidea) nel Triassico inferiore (Olenekiano) della regione di Ambilobé (NO Madagascar).

Brambilla *et al.* (2002) hanno descritto su un campione di tre esemplari, rinvenuti in alcuni giacimenti del Triassico inferiore (Olenekiano) della regione di Ambilobé (NO Madagascar), la nuova specie *Halicyne gondwanae* (ordine Cycloidea Glaessner, 1928, famiglia Cyclidae Packard, 1885), la prima segnalazione di questo genere nel Gondwana. La descrizione morfologica di questa specie non è stata sufficientemente approfondita per l'incompletezza degli esemplari. Durante una recente campagna di ricerca, uno degli autori (G. Pasini) ha rinvenuto un nuovo esemplare appartenente a questa specie. Il suo discreto stato di conservazione ha permesso di descrivere alcuni caratteri morfologici non osservati negli esemplari precedentemente studiati e di fornire una ricostruzione tridimensionale di *Halicyne gondwanae* Brambilla *et al.*, 2002. Infine, la scoperta di questo nuovo esemplare, proveniente da un affioramento diverso dagli altri, estende la distribuzione geografica di questo ciclode all'interno del bacino di Ankitokazo.

Parole chiave: Crustacea, Cycloidea, Triassico inferiore, NO Madagascar.

* Museo Civico dei Fossili di Besano, Via Prestini 5, 21050 Besano (Varese), Italia. e-mail: museodibesano@tiscali.it

** Museo Civico di Storia Naturale, C.so Venezia 55, 20121 Milano, Italia. e-mail: a.garassino@tin.it

Introduction

Ambitambonoagna, the field collecting area of the study specimen, is located near the mountain chain, Andavakoera, along the dirt road from Ambilobé to Vohe-mar on the coast of the Indian Ocean, two kilometres beyond the small village of Anjavimilay in the direction of Betsiaka (Fig. 1). The outcrop, partially covered with vegetation, is located along the north side of some low hills that follow, on the left, the course of the road. Here, natural erosion by rain has exposed a strip of grey shales, rich in small and medium-size nodules (diameter between 2 and 8 cm),



Fig. 1 – Geographical map of NW Madagascar. The asterisk indicates Ambientambonoagna locality where the study specimen was discovered.

Fig. 1 – Mappa geografica del NO Madagascar. L'asterisco indica la località di Ambientambonoagna dove l'esemplare studiato è stato rinvenuto.

while large nodules are usually incomplete or broken into many fragments (Figs. 2, 3). Superficial collecting has provided about 250 complete nodules of which only 21 were used and collected for statistical purpose.



Fig. 2 – General vision of Ambitambonoagna locality.

Fig. 2 – Visione d'insieme della località di Ambitambonoagna.



Fig. 3 – The eroded low hills close to the fossiliferous locality.

Fig. 3 – Le basse colline erose in prossimità della località fossilifera.

The faunal assemblage includes ammonites usually broken, preserved as outer moulds covered with shells of bivalves, two fragments of plants, some incomplete fishes, such as *Bobasatrania* and *Australosomus*, indeterminate bivalves, two small decapod crustaceans comparable to *Ifasya* Garassino & Teruzzi, 1995, and some unidentified invertebrates, in addition to the cycloid described here (Garassino & Teruzzi, 1995).

All nodules are extremely light and some are friable and loose. They have different or altered mineral composition compared to the strongly mineralised siliceous nodules from the classical localities of Ankitokazo Basin. The atypical character of these nodules could be attributed to transformations during the intrusive phase of the classical auriferous quartz-barite veins of Betsiaka region, considered post Triassic in age (Lacroix, 1922).

Even though the fossil fishes are more rare, the faunal assemblage of Ambitambonoagna does not differ from that collected close to Mahatsara, the locality where the first specimens of cycloids were discovered (Brambilla *et al.*, 2002). For this reason, we ascribe also the new specimen to the Olenekian (Lower Triassic) (Garassino & Pasini, 2002).

Material

The present study is based on one specimen, discovered at the Ambitambonoagna locality, an outcrop located about 2 km to the left of the road from Anjavimilay to Betsiaka (Fig. 1). The specimen (MSNM i26230) is preserved flattened inside a subellipsoidal nodule, associated with one decapod crustacean and its study allows to expand the morphological description of *Halicyne gondwanae* Brambilla *et al.*, 2002.

Acronym: MSNM, Museo Civico di Storia Naturale di Milano.

Systematic Palaeontology

Class Maxillopoda Dahl, 1956
 Subclass Halicyna Gall and Grauvogel, 1967
 Order Cycloidea Glaessner, 1928
 Family Cyclidae Packard, 1885
 Genus *Halicyne* von Meyer, 1844

Type species: *Limulus agnotus* von Meyer, 1838

Halicyne gondwanae Brambilla, Garassino, Pasini & Teruzzi, 2002
 Figs. 4, 5, 6

MSNM i26230: carapace length = 8 mm, carapace width = 7 mm.

Brambilla *et al.* (2002) described *Halicyne gondwanae* on the basis of three specimens (MSNM i13280, i22868, i25461) from the Mahatsara outcrop (Ifasy river), giving an incomplete morphological description because of the poor state of preservation of the study specimens.

In recent field collecting, one of the authors (G. Pasini) gathered in the Ambitambonoagna locality this new specimen. Its good state of preservation allowed recognition of some morphological characters not observed in the previous speci-

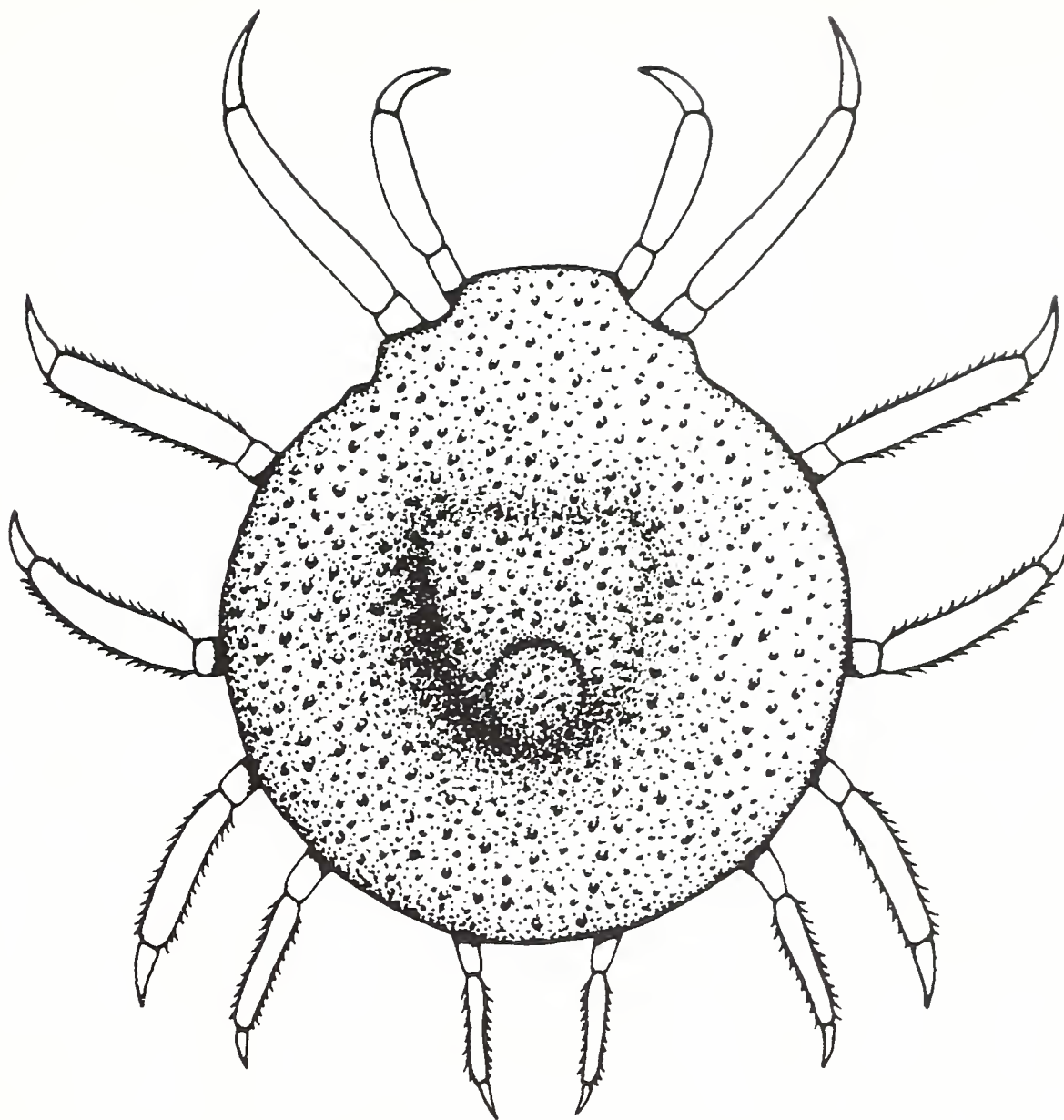


Fig. 4 – *Halicyne gondwanae* Brambilla *et al.*, 2002, reconstruction.

Fig. 4 – *Halicyne gondwanae* Brambilla *et al.*, 2002, ricostruzione.

mens, expanding and completing the description of this species. So we give here a new description of *Halicyne gondwanae* Brambilla *et al.*, 2002, expanding the original description with the characters observed in the new specimen. All morphological characters allowed a three-dimensional reconstruction of *Halicyne gondwanae* Brambilla *et al.*, 2002.

The body is subcircular in outline. The carapace has the form of a subcircular shield as long as wide. The dorsal surface of the carapace shows a strong papillose surface, as well as a central triangular papillose plate. The underside of the carapace in the region of the thorax has a dense arrangement of subparallel lamellae. A broad, papillose rostral plate extends forward from the anterior margin of the carapace shield, bearing distinct paired bosses. None of the specimens preserve much of the antennules and antennae. The maxillae have a short delicate distal extremity and thin serrations on the medial edge of the moderately long penultimate segment. Even though well developed and directed forward, the maxillae appear smaller than the maxillipedes. The very long maxillipede I has a long and delicate distal extremity and has a distinct anterior orientation extending out in front of the head. None of the specimens preserve maxillipede II. The well-developed walking legs extend laterally from the body and they are distributed along the lateral margins of the carapace. The first two pairs of the walking legs have their distal extremity directed forward. All walking legs have the lateral margins with a row of thin spines. None of the specimens preserve the abdomen and caudal rami.



Fig. 5 – *Halicyne gondwanae* Brambilla *et al.*, 2002, n. cat. MSNM i26230, photo and reconstruction, (x 7.5).

Fig. 5 – *Halicyne gondwanae* Brambilla *et al.*, 2002, n. cat. MSNM i26230, foto e ricostruzione (x 7,5).



Fig. 6 – *Halicyne gondwanae* Brambilla *et al.*, 2002, n. cat. MSNM i26230, anterior part of carapace. m1 = maxillae; m2= maxillipede I; b= bosses on rostral plate.

Fig. 6 – *Halicyne gondwanae* Brambilla *et al.*, 2002, n. cat. MSNM i26230; parte anteriore del carapace. m1 = maxillae; m2 = maxillipede I; b= protuberanze della piastra rostrale.

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